A Proposal to:

National Oceanic and Atmospheric Administration, Office of Coastal Management

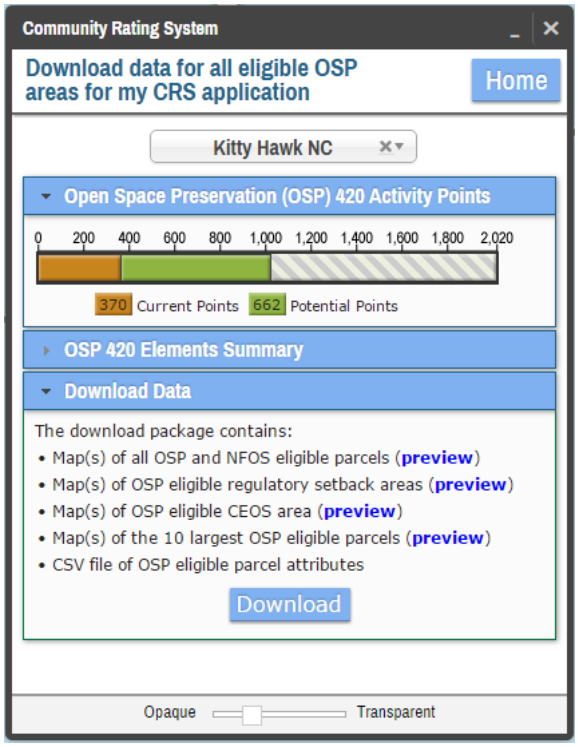
2016 Coastal Management Fellowship Program

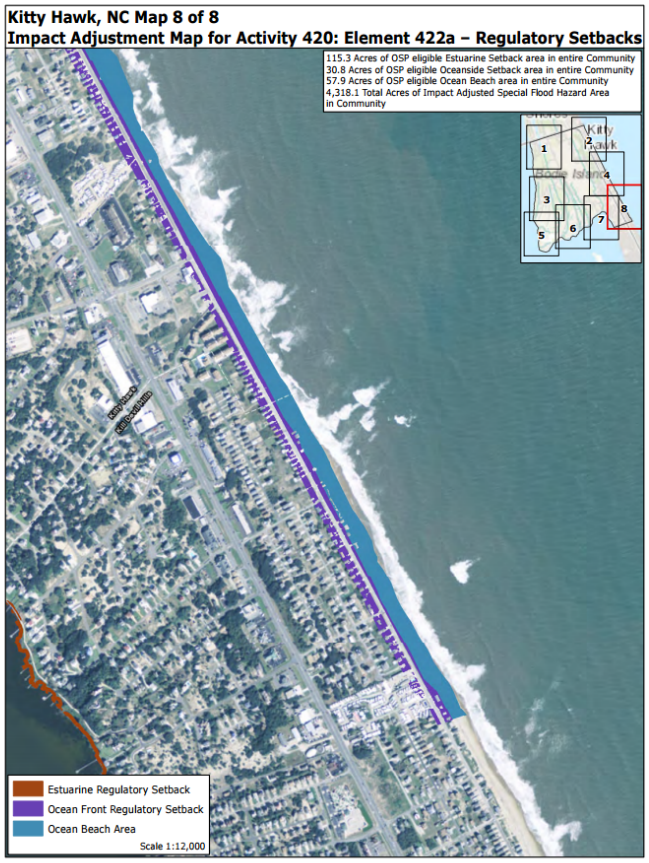
Submitted by:

The Nature Conservancy

Project Title:

"Strategic Opportunities for Digital Coast:
Addressing Hazard Risk and Identifying Nature-Based Adaptation Solutions
Through Salty and Freshwater Coastal Resilience in North Carolina, Michigan, and Across the U.S."





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I. Background & Introduction

Storms and floods affect hundreds of millions of vulnerable people, important infrastructure, and tourism, with significant losses to local and national economies and livelihoods. Climate change and coastal development are dramatically increasing habitat loss and the risk of catastrophic damage to coastal communities. Seventy-five percent of coral reefs are rated as threatened, more than 85% of oyster reefs are gone, and in the Laurentian Great Lakes, containing 21% of the world's surface fresh water, 50% of coastal wetlands have been lost basin-wide, with 95% lost in Western Lake Erie alone. These losses raise future risks by further exposing communities and assets to coastal inundation.

The Digital Coast Partnership and 2016 Coastal Management Fellowship Program are directly addressing these issues by providing data, tools and training in order to make more informed decisions, and build capacity to deliver relevant information to coastal communities. **Through the partnership, The Nature Conservancy (TNC) is submitting this proposal to the Fellowship Program to explicitly address how healthy coastal ecosystems have a significant role in increasing the resilience of coastal communities.**

TNC and NOAA's Office for Coastal Management (OCM) have been collaborating through the Digital Coast Partnership since 2008. A hallmark of the partnership has been the collective development of online decision support tools and crosscutting trainings for assessing risks of coastal hazards and emphasizing nature-based adaptation solutions. TNC leads a Tools and Training subgroup that aims to compare online decision support tools across the partnership organizations to educate users on their similarities and differences, and guide the use of specific tools within the context of a planning process. To date, TNC and OCM have jointly developed and provided training sessions at conferences including Restore America's Estuaries, Coastal Geotools, National Adaptation Forum, Association of State Floodplain Managers (ASFPM), Social Coast Forum, and Rising Seas Summit.

In addition, TNC and OCM have co-developed toolkits to help communities understand coastal inundation, provided support for how coastal wetlands conservation can reduce impacts of sea level rise, contributed to the development of the U.S. Climate Resilience Toolkit, developed and delivered joint trainings on tools, restructured the Digital Coast Partnership to have subgroups with specific leadership roles, and enacted specific goals of the Department of Commerce Strategic Plan[1].

The Strategic Plan states several goals where TNC and OCM are in complete alignment:

- Advance the understanding and prediction of changes in the environments (Goal 3.1)
- Strengthen the resiliency of communities and regions (Goal 3.3)
- Foster healthy and sustainable marine resources, habitats, and ecosystems (Goal 3.4)
- Enable U.S. businesses to adapt and prosper by developing environmental and climate informed solutions (Goal 3.5)

To further enable these goals, TNC and OCM are now working to build resilience in the Southeast U.S. We are engaging four communities in Florida, Georgia, South Carolina, and North Carolina to build awareness of available resources, ensure adequate training at the local level, and incorporate natural infrastructure conservation and restoration into planning. This work will continue throughout 2016 and into 2017 and will result in a comprehensive training plan for each community.

[1] The Digital Coast effort plays an important role in implementing the goals under the Department of Commerce Strategic Plan - https://www.commerce.gov/news/blog/2014/03/department-commerce-releases-fy-2014-2018-strategic-plan

With the continued growth of the partnership and TNC's integral role in Digital Coast, there is a substantial need for more capacity to advance the activities and projects proposed here that apply data, tools, and training in order to more fully support the resilience of coastal communities.

2012 Digital Coast Fellowship Program

In 2012 TNC and ASFPM were granted a Digital Coast fellow, Laura Flessner, to divide her time between the two organizations. The focus of the fellowship was to examine nature-based risk reduction efforts in floodplain and coastal environments. In alignment with both TNC's Coastal Resilience program and ASFPM's No Adverse Impacts program, the fellow developed a framework for identifying multi-beneficial wetland restoration opportunities and identified key resources that integrated watershed-based risks, community impacts, and the role of nature-based solutions for developing adaptation and mitigation strategies. At the end of the two-year fellowship TNC was able to hire Laura full time to continue to expand the Coastal Resilience program in a professional capacity.

Like the 2012 fellowship, TNC's goal for the 2016 fellow is to enable them to thrive in a productive and stable work environment, develop an outstanding work ethic, and ultimately continue in a professional career path at the end.

Coastal Resilience

Coastal Resilience (http://coastalresilience.org) is a program developed in 2008 through another public-private partnership focused on examining nature's role in reducing coastal community risk that includes an approach and decision support tool (http://maps.coastalresilience.org) for climate adaptation and resilience planning. The approach consists of four critical steps: (1) **Assess Risk and Vulnerability** to coastal hazards including current and future storms and sea level rise; (2) **Identify Solutions** for reducing risk across social, economic and ecological systems; (3) **Take Action** at priority conservation and restoration sites to help communities identify and implement nature-based solutions; and (4) **Measure Effectiveness** to ensure that efforts to reduce risk while increasing community and ecosystem resilience are successful.

The web mapping decision support tool includes a data-viewing platform and suite of web apps designed and tailored to meet specific planning needs around the U.S. and globally. The mapping tool is largely focused on identifying nature-based adaptation and mitigation solutions but also includes information for supporting disaster response, coastal habitat restoration and climate change policy efforts. A large portion of the fellow activities and projects proposed here will support the Coastal Resilience program.

II. Goals & Objectives

The overall project goal is to help promote a nature-based adaptation approach to coastal hazards through participation in The Nature Conservancy's Coastal Resilience program, and advance this approach across the U.S. by supporting and leveraging two local scale efforts: the Community Rating System (CRS) application process in North Carolina, and hazard mitigation planning in Michigan. This program and project work will further the objecitves of Coastal Resilience to identify nature-based solultions that reduce community risk and enhance resilence from sea level rise and flood hazards. In collaboration with Digital Coast, work in Coastal Resilience will also contribute to a Tools and Traiing

subgroup of the partnership, providing a venue to communicate, gather feedback, and inform efforts in North Carolina and Michigan. Based on previous success with the 2012 Digital Coast Fellowship Program, the fellowship objectives for 2016 are to mentor, develop, and establish the fellow on a career path with TNC that is in alignment with the Healthy Coastal Ecosystems and Resilient Coastal Communities strategic focus areas of Digital Coast.

Healthy Coastal Ecosystems

Recognizing the connection between healthy coastal ecosystems and resilience, the fellow will support coastal and ocean resource managers in their efforts to conserve and restore critical coastal habitats (e.g. oyster and coral reefs, tidal marshes and mangroves). The following fellow objectives support this strategic focus area:

(1) Tool and Training subgroup

Participate in the Tools and Training subgroup of the Digital Coast Partnership, develop a partnership "charter," and identify and help implement two collaborative training opportunities

(2) Coastal Resilience

Participate in the Coastal Resilience network of practitioners in order to learn about TNC's ongoing coastal habitat conservation and restoration efforts, and assist in building a Coastal Resilience training module that includes integration with OCM training topics related to green infrastructure and conservation

Participating in the Tools and Training subgroup and the Coastal Resilience network will give the fellow an opportunity to develop pertinent materials that will inform nature-based decisions as well as experience communicating how nature plays a role in coastal hazard issues from local to national scales.

Resilient Coastal Communities

The fellow will explicitly demonstrate the impacts of coastal hazards and climate change while promoting awareness of how healthy coastal ecosystems, or nature-based solutions, can reduce risk in specific coastal communities. The following fellow objectives support this strategic focus area:

(1) Community Rating System

- Advance a Community Rating System (CRS) advisory committee, in collaboration with Coastal States Organization (CSO) and ASFPM's Green Guide project, to leverage key partnerships (e.g. FEMA, NOAA, SeaGrant) to explore a pilot project in North Carolina where a CRS web app is informing specific communities in their application process (year one)
- Through participation in the CRS advisory committee and outreach to TNC field programs, help identify and assist in the implementation of the CRS web app in two other geographies (e.g. Southeast Atlantic) in association with specific CRS planning processes (year two)

(2) Coastal Resilience Western Lake Erie

- Facilitate the expansion of Coastal Resilience to Western Lake Erie by participating in an initial Community Resilience Building Workshop in Monroe, Michigan and helping to assess local and state regulatory barriers to incentivize and enable a community to consider coastal natural infrastructure solutions (year one)
- Advance Coastal Resilience Western Lake Erie to catalyze implementation of conservation actions that advance ecological and human wellbeing goals at regional and local scales by helping to develop and train on the use of the decision support tool (year two)

Activities in the CRS advisory committee and relevant CRS-related projects, as well as an emerging Coastal Resilience Western Lake Erie project, will give the fellow hands-on experience communicating climate impacts and adaptation approaches to diverse stakeholder groups while contributing to local planning processes.

III. Project Descriptions, Milestones & Outcomes

The activities and projects stated above are further described below, and include major milestones and outcomes.

Activities

(1) Tools and Training subgroup

The overall purpose of the Digital Coast partner subgroups is to provide an opportunity for deeper dives into key topic areas that align with the Digital Coast strategic plan and partner priorities. With TNC's leadership, the Tools and Training subgroup was formed to communicate the latest developments in web-based tools and toolkits across the partnership in order to leverage their use in coastal hazard and adaptation planning processes. TNC, ASFPM, NACO, Wisconsin Sea Grant, and OCM formed the subgroup to develop fact sheets, tool comparison documents, and a joint training session at the National Adaptation Forum last May (2015). We propose to have the 2016 fellow participate in the Tools and Training subgroup in order to identify crosscutting tool integration and training opportunities across the partnership, and add necessary capacity to the subgroup to expand its scope through a charter. We anticipate travel for the fellow for this activity to be through partnership meetings in both years, as well as workshop travel covered by TNC in year two.

Major activity milestones and timelines include:

Milestone	Timeline
Member organizations are brought back together to review the goal and existing communication materials of the subgroup and draw up a "charter" that establishes a vision and objectives	August – October 2016
Alignment with the Communication subgroup generates materials for the user community to understand the array of existing and new tools as they pertain to specific planning processes; draft products determined and generated; collaborative trainings that feature multiple tools are identified	November 2016 – April 2017
Wider partnership provides input to draft products; OCM assess them for Digital Coast website; subgroup finalizes products	May 2017 – July 2017
Two workshops at conferences or other venues are carried out; training curricula will be fed into a Coastal Resilience training module and align with the new Digital Coast website and training section.	August 2017 – July 2018

The outcome of the fellow participating in the Tools and Training subgroup is increased capacity and leadership to the Digital Coast Partnership and alignment with the Communications subgroup as well as experience delivering workshop trainings.

(2) Coastal Resilience

The Coastal Resilience approach and decision support tool have been instrumental globally and locally in guiding decisions to assess risk and identify risk reduction solutions. The tool operates U.S. nationwide and globally, rapidly expanding to 17 U.S. coastal states, the Caribbean, and across Mexico and Central America, having reached over 100 communities since 2008. TNC intends to increase coverage of the tool and custom web apps to more U.S. states, in more sites in Mexico, and into Southeast Asia in the next two years. As the network continues to expand, establishing a training module to effectively communicate the value and usability of the Coastal Resilience decision support system to key stakeholders is a priority. The module will provide a variety of learning, outreach, and training resources for both technical and general audiences that will be coordinated with similar efforts within the Digital Coast website training section, specifically on green infrastructure and conservation issues. Lead Coastal Resilience Manager, with support from the Spatial Analyst (former Digital Coast fellow in 2012), will mentor the 2016 fellow to develop technical skills and Coastal Resilience training materials.

Major activity milestones and timelines include:

Milestone	Timeline
Gained competency of the Coastal Resilience network, and participation in the Esri User Conference and other beneficial trainings to advance professional development	August 2016 – July 2017
Clear linkages established with complimentary green infrastructure and conservation-oriented trainings provided by Digital Coast to ensure consistency of training design and delivery provided across the partnership	August 2017 – January 2018
Assisted in the development of a Word Press-based Coastal Resilience training module on coastalresilience.org. Coordinated with Digital Coast staff and the former 2012 fellow to compile information, generate content, and establish links to the Digital Coast website and training section.	February 2018 – July 2018

By contributing to the Coastal Resilience network, the fellow will establish valuable technical skills while learning how to effectively develop materials to train others to use a decision support system for adaptation and risk reduction planning at various scales.

<u>Projects</u>

(1) Community Rating System

The National Flood Insurance Program's Community Rating System (CRS) is a voluntary program administered by the Federal Emergency Management Agency (FEMA) that encourages communities to reduce their flood insurance rates by performing activities that promote the protection of open space in Special Flood Hazard Areas. As part of the Coastal Resilience decision support system, a customized CRS web app in North Carolina was developed to help planners identify areas within a community that are eligible for Open Space Preservation (OSP) credits. This app was developed for seven pilot communities in Dare County, North Carolina, to address the needs of local planners who are updating their CRS applications. The app identifies open space areas, exports maps and summary tables for use in the CRS application process, and allows users to search and view individual parcels that currently contribute to OSP credits.

Major project milestones and timelines include:

Milestone	Timeline
Supported the outreach, training and implementation of the CRS web app in Dare and Hyde County, North Carolina	August – November 2016
Helped establish a CRS advisory committee made up of Digital Coast partners, FEMA, SeaGrant, and TNC field programs to determine how and where to expand the CRS web app and identify collaborative trainings, and explore opportunities to influence FEMA's calculation and application requirements for OSP credits	December 2016 – May 2017
Collaborated with CSO/ASFPM's Green Guide to illustrate how coastal communities can utilize spatial analyses, web apps, and best practices in applying for OSP credits	March 2017 – May 2017
Examined how the CRS web app and map services can work with other tools including NOAA's Flood Exposure Mapper	June 2017 – July 2017
Identified two other geographies and engaged those communities with support from the advisory committee	August 2017 – January 2018
Participated in appropriate community trainings using the CRS web app	February 2018 – July 2018

The outcome of the fellow contributing to the CRS advisory committee and web app development is to support local and national participation in the CRS program and promote the value of nature-based approaches like open space in reducing community flood risk.

(2) Coastal Resilience Western Lake Erie

TNC has built a spatial optimization model for 150 miles of shoreline in Western Lake Erie (WLE) that maps the places where conservation actions can benefit nature and people. The map does two things: 1) *informs* conservation practitioners and communities about where they can meet multiple, stakeholder-supported ecological s and human wellbeing goals at the lowest socioeconomic cost and 2) it *justifies* actions that are proposed, or have already been taken, to constituents and funders to show effectiveness (e.g., land acquisition, community place-making). The map has been used through the Great Lakes NOAA-TNC Restoration Partnership, where TNC recommended five restoration sites in the Maumee River EPA-designated Area of Concern (AOC), a focal area for the Great Lakes Restoration Initiative Action Plan II. NOAA funded the engineering and design of the top-recommended site, Toussaint State Wildlife Area, with scientific justification that restoration would 1) help delist the AOC, 2) advance regional ecological goals and 3) enhance human wellbeing. The Conservancy will continue to engage WLE conservation partners, but new opportunities exist to engage coastal communities through the development of a decision support tool to help inform municipal decisions to conserve new lands through restoration or planning updates (i.e., master plan, hazard mitigation plan), accessing new funding and influencing a broader constituency on the link between healthy coastal systems and human wellbeing. WLE will represent the first freshwater lake application of Coastal Resilience.

Major project milestones and timelines include:

Milestone	Timeline
Participated in a Community Resilience Building Workshop in Monroe, Michigan, based on Coastal Resilience Connecticut and OCM roadmap frameworks	August – October 2016
Helped to catalyze and enable preliminary conservation actions based on a socioeconomic analyses	November 2016 – April 2017
Assisted in the identified local and state regulatory barriers to incentivize and enable a community to consider coastal natural infrastructure solutions, and helped establish recommendations for how to leverage this work across the U.S.	May 2017 – October 2017
Helped establish Western Lake Erie as part of the Coastal Resilience network and decision support system	November 2017 – April 2018
Established clear links, through websites and outreach, between Coastal Resilience, the Great Lakes Inform tool, and Great Lakes Coastal Resilience Planning Guide	May 2017 – July 2018

The outcome of the fellow participating in the development of Coastal Resilience Western Lake Erie is to update Monroe's Master Plan and enable coastal natural infrastructure policies and practices to be applied more broadly with support from this and other tools in the region.

IV. Fellow Mentoring

The 2016 Digital Coast fellow will be located within TNC's Global Oceans team in Seattle, Washington. The fellow will be mentored by Zach Ferdaña, Lead Coastal Resilience Manager, with support provided by Laura Flessner, 2012 Digital Coast fellow and Global Ocean's Spatial Analyst. Zach has over 15 years of TNC experience and has led the development of Coastal Resilience since its inception in 2008. His background in conservation planning, GIS, web-mapping tools, program and project management will be an asset to the fellow. Laura, having successfully transitioned from the 2012 Digital Coast fellowship program to an established career path, will offer advice on successfully balancing the workload across activities and projects and how to best leverage the skills learned as a fellow into a professional career. She will also support the fellow's professional development by sharing best practices pertaining to GIS analysis, tool training, and science communication. Over the course of the fellowship, other TNC colleagues including Adam Whelchel (Connecticut), Katherine Kahl (Michigan), Sarah Murdock (Washington D.C.), Mary Conley (South Carolina), and Christine Pickens (North Carolina) will contribute their expertise ranging from planning to on-the-ground implementation across both science and policy realms. In addition, the fellow will be exposed to a suite of domestic and international geographies where Coastal Resilience is being applied.

V. Project Partners

The design of this proposal will expose the fellow to a wide array of partners through the activities and projects:

- Digital Coast Partners who participate in the Tools and Training subgroup (NOAA OCM, ASFMP, NACO and Wisconsin Sea Grant). This initial activity will set the stage for further partnership development as the fellow contributes to the Coastal Resilience network.
- Led by TNC, Coastal Resilience is a program developed through a public-private partnership between United Nations University, NOAA, USGS, Natural Capital Project, ASFPM, University of California at Santa Cruz, University of Southern Mississippi, Esri, Alliance for Development Works, the International Federation of the Red Cross and Red Crescent Societies. The fellow will work with

several of these partners to gain Coastal Resilience network technical skills and develop the training module.

- Local Coastal Resilience projects have developed their own partnership coalitions. The fellow will be working directly with TNC in North Carolina to partner with planners in Dare County, Hyde County, the North Carolina Coastal Federation, and North Carolina Sea Grant. Specific to the CRS advisory committee, TNC is just starting to assemble this group to include OCM and FEMA, as well as Sea Grant programs, which will be established as an initial activity of the fellow.
- In Michigan, the fellow will work directly with TNC Michigan, Monroe City and County government, Michigan Office of the Great Lakes, University of Michigan, Upper Midwest and Great Lakes Landscape Conservation Cooperative.

Partnership development is a key component to both the activities and projects identified in this proposal, whether to help influence the direction of the Digital Coast Partnership (e.g. Tools and Training subgroup), or a planning process in North Carolina (e.g. CRS) or Michigan (e.g. Master Plan).

VI. Cost Share Description

The Nature Conservancy will provide the $15,000 match required for the Coastal Management Fellowship Program. The non-federal match requirement will come from private foundation funding and general membership support funds, and is already being factored into our fiscal year 2017 work planning (July 1, 2016 to June 30, 2017). In addition, TNC will supply the fellow with all workplace support necessary, including desk, phone, computer and required software, printers and office supplies. As identified in the proposal, TNC will also cover additional travel for relevant tasks.

VII. Strategic Focus Areas

TNC is a globally recognized leader in the conservation and restoration of plants, animals and natural communities. Increasingly, TNC is making the case for nature-based defenses that reduce community risk through science, planning, policy and action. The goal of TNC's Climate Risk & Resilience strategy (Coastal Resilience program resides therein) is to "mainstream the role of coastal natural and nature-based defenses for reducing risks from storms, flooding and sea level rise in order to enhance the resiliency of these coastal habitats that provide multiple ecosystem service benefits to hundreds of million people." TNC is leading several teams of engineers, economists and financiers for the World Bank, USAID and the Rockefeller Foundation and with Swiss Re, Lloyds, Deltares and CH2M to identify when, where and how to create innovative incentives to conserve and restore coastal habitats for risk reduction. By exploring different partnership opportunities that combines social, economic and ecological resilience, TNC is a significant contributor to the Healthy Coastal Ecosystems and Resilient Coastal Communities strategic focus areas of Digital Coast.

TNC now has a proven track record of mentoring a Digital Coast fellow and offering a professional position after the fellowship program ends. **Given the opportunity reflected in this proposal, the 2016 fellow will also be exposed to this incredible body of work, substantially contribute to it, and be mentored for professional career success.**